

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
 United States Patent and Trademark  
 Office  
 Box PCT  
 Washington, D.C.20231  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 14 June 2000 (14.06.00)	<b>Applicant's or agent's file reference</b> PDG/20952
<b>International application No.</b> PCT/GB99/03356	<b>Priority date (day/month/year)</b> 09 October 1998 (09.10.98)
<b>International filing date (day/month/year)</b> 11 October 1999 (11.10.99)	
<b>Applicant</b> KNEE, Michael, James et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

08 May 2000 (08.05.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

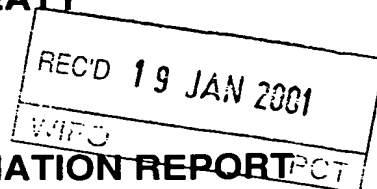
made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b> Juan Cruz Telephone No.: (41-22) 338.83.38
--	--

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference PDG/20952	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB99/03356	International filing date (day/month/year) 11/10/1999	Priority date (day/month/year) 09/10/1998
International Patent Classification (IPC) or national classification and IPC H04N7/30		
Applicant SNELL & WILCOX LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 8 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 08/05/2000	Date of completion of this report 17.01.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Moorhouse, D Telephone No. +49 89 2399 8631 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03356

**I. Basis of the report**

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:

**Description, pages:**

1-10 as originally filed

**Claims, No.:**

1-11 as originally filed

**Drawings, sheets:**

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03356

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.  
☐ paid additional fees.  
☐ paid additional fees under protest.  
☒ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.  
☒ not complied with for the following reasons:  
**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.  
☒ the parts relating to claims Nos. 5-11.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims 5-11
	No: Claims
Inventive step (IS)	Yes: Claims 8, 10, 11
	No: Claims 5-7,9

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB99/03356

---

Industrial applicability (IA)    Yes:    Claims    5-11  
   No:    Claims

2. Citations and explanations  
**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB99/03356

**Concerning Box IV**

As indicated by the ISA, the present application relates to the following two alleged inventions:

Claims 1 to 4 : A method for estimating the severity of a picture artefact arising from block based processing.

Claims 5 to 11 : A method for estimating the signal to noise ratio of a picture signal decoded from a compressed bit-stream.

The IPEA agrees with the ISA that the requirements of Rule 13 PCT are not met. The only thing the two alleged inventions have in common is that they relate to methods of processing picture signals to judge the effects of noise / artefacts. Such methods are well known in the art, as will be apparent from the following section relating to the requirements of Article 33 PCT.

**Concerning Box V**

The following documents are cited:

D1 : US-A-5 610 729

D2 : US-A-5 675 385

D3 : US-A-5 636 295

D4 : EP-A-0 714 210

The subject-matter of claims 5 to 7 and 9 lacks an inventive step, and therefore does not meet the requirement set out in Article 33 (3) PCT.

Document D1 discloses:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB99/03356

- A method for estimating the noise of a picture signal decoded from a compressed bit stream, comprising the steps of determining the quantization values employed in said compression (see column 4, lines 33 to 35) and deriving said estimate by processing said values (see column 4, line 31 to column 5, line 36, for example).

Thus, document D1 does not mention the derivation of a signal to noise ratio (SNR). However, given the noise estimates derived according to D1 and the value of the signal, it would be obvious to the skilled person that the signal to noise ratio can easily be determined and, moreover, that the actual way of expressing the noise - viz as an SNR or an MSE etc. is unimportant. What counts in the context of the present application is the use of the quantization steps.

Thus, the subject-matter of claim 5 follows in an obvious manner from the disclosure of document D1.

The additional feature of claim 6 is rendered obvious by column 4, lines 43 to 56 and column 5, lines 7 to 22 of document D1.

The additional feature of claim 7 is rendered obvious by step (6) described in columns 5 and 6 of document D1.

The additional feature of claim 9 is automatically taken account by the relations (1) and (2) and column 5, lines 7 to 22 of document D1.

The subject-matter of claims 5 to 7 is also rendered obvious by the disclosure of document D2. Attention is drawn to Figure 3 and associated description as regards claims 5 and 6, and to Figure 5, element 52 as regards claim 7.

Thus, the subject-matter of claims 5 o 7 follows in an obvious manner from the disclosure of document D2.

The subject-matter of claims 5 and 6 is also rendered obvious by the disclosure of document D3. Attention is drawn to Figure 2, elements 50 and 60 as regards claim 5, and to column 4, lines 25 to 37 as regards claim 6.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB99/03356

Thus, the subject-matter of claims 5 and 6 follows in an obvious manner from the disclosure of document D3.

The subject-matter of claims 5 and 7 is also rendered obvious by the disclosure of document D4. Attention is drawn to Figure 1, elements 5 and 6 as regards claims 5 (since the coring control signal is related to "mosquito noise"), and to Figures 9 and 14, elements 40 and 41 as regards claim 7.

Thus, the subject-matter of claims 5 and 7 follows in an obvious manner from the disclosure of document D4.

The quadratic function of quantization scale code (claim 8), the use of an (estimate of) the bit-rate of the compressed bit-stream as the picture activity (claim 10) and the passing forward of an estimate from an upstream location (claim 11) are all not suggested in documents D1 to D4, so that claims 8, 10 and 11 meet the requirements set out in Article 33 PCT.

**Concerning Box VII**

The claims are not in the two-part form specified in Rule 6.3 (b) PCT.

Reference signs as defined in Rule 6.2 (b) PCT are absent from the claims.

The publication number of the copending application is missing from page 6 of the description.

**Concerning Box VIII**

Claims 5 to 10 lack clarity, and therefore do not meet the requirement set out in Article 6 PCT.

Claim 5

It is not at all clear, **how** the values are "processed".

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/GB99/03356

Claim 6

It is not at all clear, how the experimental value was derived. Were the said parameters used to decode the picture in question or a test picture ? Since the description provides no further detail in this respect, an objection under Article 5 PCT also arises.

Claim 7

It is not at all clear **of what (which picture)** the activity is "measured". Moreover, is it an actual activity, or a theoretical activity. The latter appears to be the case, according to the equation for H on page 9.

Claims 8 and 9

These claims at present depend on claim 5, but mention "said function of quantization scale code", which terminology first appears in claim 7.

Claim 10

This claim is objected to for the same reasons as claim 7.

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>PDG/20952</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 03356</b>	International filing date (day/month/year) <b>11/10/1999</b>	(Earliest) Priority Date (day/month/year) <b>09/10/1998</b>
Applicant <b>SNELL &amp; WILCOX LIMITED et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23 1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

## 4. With regard to the title,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

**METHOD AND APPARATUS FOR BLOCKING EFFECT REDUCTION**

## 5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

## 6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☒ because this figure better characterizes the invention.

3

☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 99/03356

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-4

A method for estimating the severity of a picture artefact from block based processing

2. Claims: 5-11

A method for estimating the signal to noise ratio of a picture signal decoded from a compressed bit-stream

## INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/03356

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H04N7/30

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 797 349 A (SAMSUNG ELECTRONICS CO LTD) 24 September 1997 (1997-09-24) page 3, line 3 -page 5, line 5	1-4
A	WO 97 40627 A (SONY CORP ;SONY ELECTRONICS INC (US); CHANG CHING FANG (US); LEE C) 30 October 1997 (1997-10-30) page 13 -page 14	1,2
A	US 5 422 964 A (DEVIMEUX DANIEL ET AL) 6 June 1995 (1995-06-06) abstract	1,2
A	US 5 732 159 A (JUNG SEOK-YOON) 24 March 1998 (1998-03-24) column 2, line 37 -column 4, line 45	1
	--- -/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

**\* Special categories of cited documents :**

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*&\* document member of the same patent family

Date of the actual completion of the international search

14 April 2000

Date of mailing of the international search report

22.05.2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Marie-Julie, J-M

## INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/03356

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 610 729 A (NAKAJIMA YASUYUKI) 11 March 1997 (1997-03-11)	5
A	abstract column 5, line 40 - line 63 ---	6-10
X	US 5 675 385 A (SUGIYAMA KENJI) 7 October 1997 (1997-10-07)	11
	abstract column 5, line 32 - line 55 ---	
A	US 5 636 295 A (KIM JONG-IL) 3 June 1997 (1997-06-03)	5
	column 2, line 44 - line 57 column 3, line 26 - line 37 column 4, line 26 - line 38 ---	
A	EP 0 714 210 A (VICTOR COMPANY OF JAPAN) 29 May 1996 (1996-05-29)	5
	abstract page 6, column 9, line 4 - line 30 -----	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03356

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0797349	A	24-09-1997	CN 1170304 A	14-01-1998
			US 5883983 A	16-03-1999
WO 9740627	A	30-10-1997	US 5933542 A	03-08-1999
			AU 2194697 A	12-11-1997
US 5422964	A	06-06-1995	FR 2690299 A	22-10-1993
			DE 69309529 D	15-05-1997
			DE 69309529 T	11-09-1997
			EP 0566202 A	20-10-1993
			JP 6062387 A	04-03-1994
			NO 931227 A	18-10-1993
US 5732159	A	24-03-1998	KR 160690 B	15-01-1999
			JP 8307870 A	22-11-1996
US 5610729	A	11-03-1997	JP 2673778 B	05-11-1997
			JP 7236140 A	05-09-1995
			GB 2287153 A, B	06-09-1995
US 5675385	A	07-10-1997	JP 8213915 A	20-08-1996
US 5636295	A	03-06-1997	KR 9705833 B	21-04-1997
			JP 6205394 A	22-07-1994
EP 0714210	A	29-05-1996	JP 2900808 B	02-06-1999
			JP 8149471 A	07-06-1996
			JP 8205158 A	09-08-1996
			US 5754699 A	19-05-1998
			CN 1126926 A	17-07-1996

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : <b>H04N 7/30</b>	<b>A2</b>	(11) International Publication Number: <b>WO 00/22834</b>
		(43) International Publication Date: 20 April 2000 (20.04.00)

(21) International Application Number: PCT/GB99/03356

(22) International Filing Date: 11 October 1999 (11.10.99)

(30) Priority Data:  
9822094.0 9 October 1998 (09.10.98) GB

(71) Applicant (for all designated States except US): SNELL &amp; WILCOX LIMITED [GB/GB]; 6 Old Lodge Place, St. Margaret's, Twickenham TW1 1RQ (GB).

(72) Inventors; and

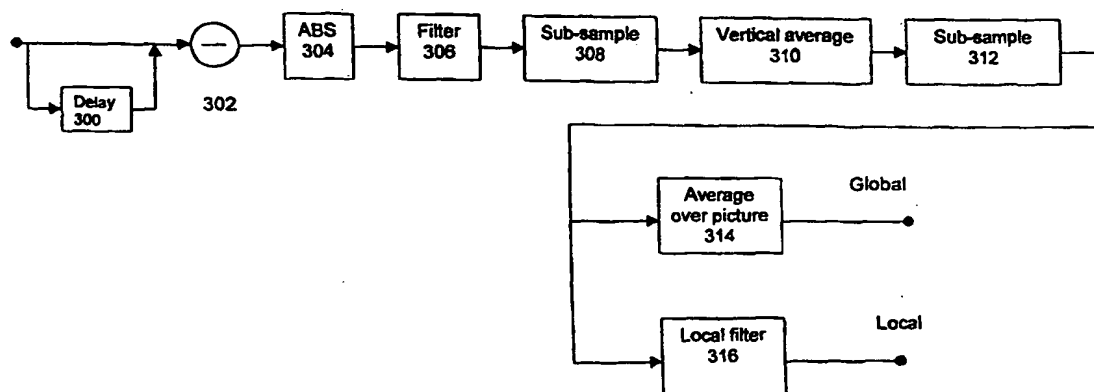
(75) Inventors/Applicants (for US only): KNEE, Michael, James [GB/GB]; 6 Woodbury Avenue, Petersfield, Hampshire GU32 2EE (GB). DIGGINS, Jonathan [GB/GB]; 16 Sussex Gardens, Petersfield, Hampshire GU31 4JY (GB).

(74) Agents: GARRATT, Peter, Douglas et al.; Mathys &amp; Squire, 100 Gray's Inn Road, London WC1X 8AL (GB).

(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

**Published***Without international search report and to be republished upon receipt of that report.*

(54) Title: METHOD AND APPARATUS FOR BLOCKING EFFECT REDUCTION



## (57) Abstract

By utilising parameters derivable from a compressed bit-stream, measures are obtained of the subjective quality of a decoded picture, without the necessity for reference to source material. A blockiness measure is derived both locally and globally and used to control a de-blocking filter. An estimate of signal-to-noise ratio is derived from quantization values.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

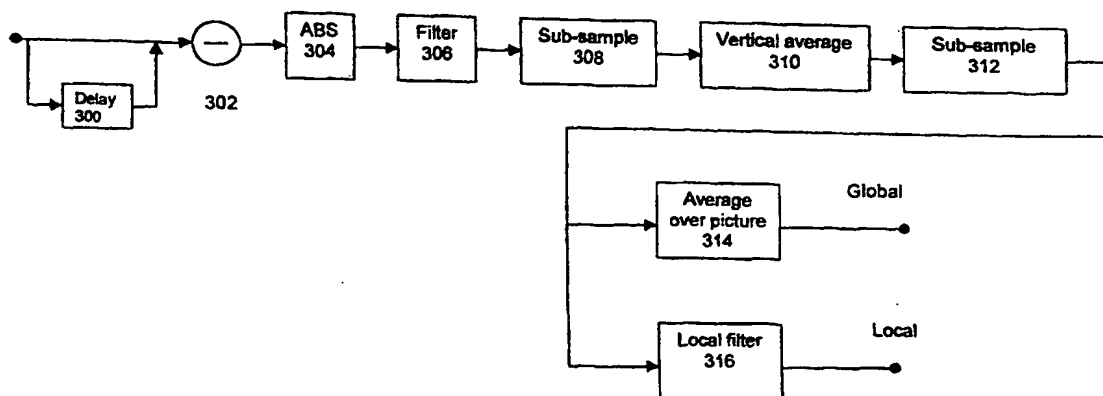
AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : <b>H04N 7/30</b>		<b>A3</b>	(11) International Publication Number: <b>WO 00/22834</b>
			(43) International Publication Date: 20 April 2000 (20.04.00)
(21) International Application Number: PCT/GB99/03356		(81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 11 October 1999 (11.10.99)			
(30) Priority Data: 9822094.0 9 October 1998 (09.10.98) GB		Published With international search report.	
(71) Applicant (for all designated States except US): SNELL & WILCOX LIMITED [GB/GB]; 6 Old Lodge Place, St. Margaret's, Twickenham TW1 1RQ (GB).		(88) Date of publication of the international search report: 8 September 2000 (08.09.00)	
(72) Inventors; and (75) Inventors/Applicants (for US only): KNEE, Michael, James [GB/GB]; 6 Woodbury Avenue, Petersfield, Hampshire GU32 2EE (GB). DIGGINS, Jonathan [GB/GB]; 16 Sussex Gardens, Petersfield, Hampshire GU31 4JY (GB).			
(74) Agents: GARRATT, Peter, Douglas et al.; Mathys & Squire, 100 Gray's Inn Road, London WC1X 8AL (GB).			

(54) Title: METHOD AND APPARATUS FOR BLOCKING EFFECT REDUCTION



## (57) Abstract

By utilising parameters derivable from a compressed bit-stream, measures are obtained of the subjective quality of a decoded picture, without the necessity for reference to source material. A blockiness measure is derived both locally and globally and used to control a de-blocking filter. An estimate of signal-to-noise ratio is derived from quantization values.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

# INTERNATIONAL SEARCH REPORT

Int'l. Application No  
PCT/GB 99/03356

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/30

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 797 349 A (SAMSUNG ELECTRONICS CO LTD) 24 September 1997 (1997-09-24) page 3, line 3 -page 5, line 5	1-4
A	WO 97 40627 A (SONY CORP ;SONY ELECTRONICS INC (US); CHANG CHING FANG (US); LEE C) 30 October 1997 (1997-10-30) page 13 -page 14	1,2
A	US 5 422 964 A (DEVIMEUX DANIEL ET AL) 6 June 1995 (1995-06-06) abstract	1,2
A	US 5 732 159 A (JUNG SEOK-YOON) 24 March 1998 (1998-03-24) column 2, line 37 -column 4, line 45	1
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

14 April 2000

Date of mailing of the international search report

22.05.2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Marie-Julie, J-M

# INTERNATIONAL SEARCH REPORT

Inte. Jonal Application No  
PCT/GB 99/03356

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 610 729 A (NAKAJIMA YASUYUKI) 11 March 1997 (1997-03-11)	5
A	abstract column 5, line 40 - line 63	6-10
X	US 5 675 385 A (SUGIYAMA KENJI) 7 October 1997 (1997-10-07)	11
	abstract column 5, line 32 - line 55	
A	US 5 636 295 A (KIM JONG-IL) 3 June 1997 (1997-06-03)	5
	column 2, line 44 - line 57 column 3, line 26 - line 37 column 4, line 26 - line 38	
A	EP 0 714 210 A (VICTOR COMPANY OF JAPAN) 29 May 1996 (1996-05-29)	5
	abstract page 6, column 9, line 4 - line 30	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 99/03356

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-4

A method for estimating the severity of a picture artefact from block based processing

2. Claims: 5-11

A method for estimating the signal to noise ratio of a picture signal decoded from a compressed bit-stream

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. J. Appl. No.

PCT/GB 99/03356

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0797349 A	24-09-1997	CN 1170304 A	14-01-1998
		US 5883983 A	16-03-1999
WO 9740627 A	30-10-1997	US 5933542 A	03-08-1999
		AU 2194697 A	12-11-1997
US 5422964 A	06-06-1995	FR 2690299 A	22-10-1993
		DE 69309529 D	15-05-1997
		DE 69309529 T	11-09-1997
		EP 0566202 A	20-10-1993
		JP 6062387 A	04-03-1994
		NO 931227 A	18-10-1993
US 5732159 A	24-03-1998	KR 160690 B	15-01-1999
		JP 8307870 A	22-11-1996
US 5610729 A	11-03-1997	JP 2673778 B	05-11-1997
		JP 7236140 A	05-09-1995
		GB 2287153 A, B	06-09-1995
US 5675385 A	07-10-1997	JP 8213915 A	20-08-1996
US 5636295 A	03-06-1997	KR 9705833 B	21-04-1997
		JP 6205394 A	22-07-1994
EP 0714210 A	29-05-1996	JP 2900808 B	02-06-1999
		JP 8149471 A	07-06-1996
		JP 8205158 A	09-08-1996
		US 5754699 A	19-05-1998
		CN 1126926 A	17-07-1996